The Use of Hybrid Contact Lenses in Keratoconus and Ectasia Patients After Intacs and Corneal Collagen Crosslinking

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INTRODUCTION

Visual reduction in keratoconus (KC) and post-surgical ectasia patients is commonly due to increased higher order aberrations (HOAs). Novel surgical treatment strategies for these irregular corneas include corneal collagen crosslinking (CXL) and intrastromal ring segments, which may improve corneal contour21 and consequently reduce HOAs as well as deferring the need for corneal grafts. However, non-surgical rehabilitation has been the primary visual management method where rigid gas permeable (RGP) lens is the standard treatment choice.

Given the significant associations between lens comfort, visual acuity and lens fitting success2, new lens designs ranging from specialty soft lenses to scleral lenses have evolved. An example is ClearKone (CK) contact lens, a recent development in hybrid lens technology. CK lens is composed of a high DK GP center fused with a surrounding soft lens skirt (Fig. 1). Earlier hybrid lens generations such as Statham and Softperm hybrid lenses commonly encountered fitting complications such as discomfort, GPC, hypoxic sequela, and junctional tears4,5.

Modern advances in hybrid lens design include the incorporation of reverse geometry radii (Fig. 2) and enhancement in fitting sagittal depth, gas permeability, and junctional adhesion, all of which appear to have improved upon the many reported shortcomings of its hybrid predecessors. The newly added features in CK lens may enable better centration and closer corneal alignment to its optical zone, which may further minimize HOAs and thereby improve visual comfort and acuity. However, given the recent release of CK lens, literature search yields little available data in its uses and clinical outcome in these KC and ectasia patients. It is important to note that CK lens utilizations in surgically treated KC and ectasia eyes (i.e., CXL, Intacs), as in this investigation, is considered an “off-label” use.

OBJECTIVE

Evaluate the performance of ClearKone hybrid contact lens in post-surgical KC and ectasia patients.

METHODS

A retrospective consecutive chart review was performed on 18 KC and ectasia eyes after Intacs or Intacs/CXL who were fitted with ClearKone hybrid contact lenses. Success was defined as eyes regularly wearing lenses 3-months post final lens fitting. Relationships of corneal topographic parameters and KC severity (via Amker-Kramer classification4) to lens success were evaluated. Best corrected habitual VA was compared to CK VA in successful eyes and final management methods for eyes unsuccessful with hybrid lenses were also analyzed.

RESULTS

18 eyes (14 KC, 4 ectasia) in 17 patients after Intacs (N=3) or Intacs/CXL (N=15) fit with CK lenses were reviewed. 22.2% (4/18), 33.3% (6/18), 0.0% (0/18), 44.4% (8/18) were identified stages 1, 2, 3 and 4 respectively. Mean age was 33.3 years (ranging 22-52) and mean Kmax was 51.9 ± 4.89.

14 of 18 eyes (77.8%) were successfully fit with CK lenses; 100% of eyes receiving Intacs (3/3) and 71.4% (10/14) Intacs/CXL eyes experienced success. Mean logMAR UCVA and habitual correction after surgical treatment was 0.54 and 0.33 whereas VA further improved with CK lens to 0.14 (p<0.001) (Fig. 4). A mean increase of 2.00 Snellen lines was observed in those successful with CK lenses while 57.1% (8/14) reporting a gain of 2 or more lines.

Of the 3 eyes wearing habitual contact lenses at presentation and successful, 33.3% showed no VA change (1/3) with CK lens relative to previous lens modality. The reason cited for continuing CK lens wear, despite no VA improvements, was improved lens comfort.

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<th>Table 1: Baseline topographical parameters</th>
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CONCLUSIONS

Since the initial use of CK lenses by the investigators coincided with the start of this study, a learning curve effect may have contributed to fitting failure in the 4 post-Intacs/CXL eyes as these were the first 4 eyes fit in this retrospective review. Success was otherwise reached in all 14 eyes thereafter. The reasons cited for discontinuing CK lens wear were difficulty with insertion and removal (75.0%) and discomfort (25%).

Corneal topographical parameters (Table 1), KC severity, manifest refractive spherical equivalence or cylinder, was not associated with success rate.

Alternate lens options in failed eyes with CK lenses 22.2% (4/18) were GP lenses (2), scleral lenses (1), and soft custom torics (1).

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